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CRUISE REPORT

Ship Name: R. D. CONRAD Cruise No: 19-01

Departure: 19 July, 1975 (Date) from Piermont, New York (Port)

Arrival: 4 August, 1975 (Date) at New York (Brooklyn) (Port)

Days at Sea: 16 Days Foreign Port: 0 (No. of days in arrival port)

Area of Operation:

New York Bight

Program Description:

Combined geochemical-physical oceanographic study of water and sediments of New York Bight, Hudson Shelf channel, and Hudson Canyon.

Participants: (All L-DGO unless otherwise specified)

Pierre Biscaye	Co-Chief Scientist
Tony Amos	" "
Ted Baker	Hydro Tech
Mathew Bye	" "
Eugene Molinelli	" "
Katherine Cooke	" "
Scott Daubin	STD Tech
Jan Szelag	" "
Albert Hagen	Core Bosun
James Williar	E.T.
Bruce Deck	Geo Chem
Herbert Feely	" "
Martin Friedman	Geo Chem
Adele Hanley	" "
Catherine Hayward	" "
David Kadko	" "
Carolyn Kent	" "
Arthur Markwalter	" "
Guy Mathieu	" "
Curtis Olsen	" "
Michael Prokopchak	" "
John Toggweiler	" "
Thomas Torgerson	" "

All inquiries regarding cruise should be made to the chief scientist.

CRUISE REPORT

CONRAD Cruise 19 Leg 1

Piermont to New York (Brooklyn), 19 July to 4 August 1975

OBJECTIVES

The objectives of this leg were a combined geochemical-physical oceanographic study of the hydrography, mixing and sediment dispersal processes on the Continental Shelf and Upper Continental Slope in the New York Bight. Having done a similar study in October 1974 on VEMA 32-01, the objective was to compare the results of the CONRAD analyses, done under summer hydrographic conditions, with those of the autumn regime.

The work is funded by the Energy Research Development Administration (ERDA) under contract AT (11-1) 2185 into which the former contract AT (11-1) 3132 has been combined. ERDA's objectives in funding this work is to understand the disposal paths and the rates at which the mixing and exchange of water in the Bight takes place, in which the effects of present and potential anthropogenic influences - chemical pollutants, solid garbage, thermal plumes, oil spills and leaks from drilling operations,etc. - are dispersed and diluted.

The track was laid out to approximate but not duplicate the one made on VEMA, and consisted roughly of two transverse sections across the shelf from 25 to 1000 fathoms water depth; roughly three longitudinal (parallel to isobath) sections between the transverse sections; and a number of stations in both the Hudson Shelf Channel and Hudson Canyon.

ACCOMPLISHMENTS

During the sixteen days at sea we made seventy-two stations at which one or more measuring instruments or sampling devices were lowered into the water. Several stations were occupied more than once during the leg to determine variability on that time scale, and a number of stations were reoccupations of stations made on VEMA 32-01.

GEOCHEMICAL PROGRAM

The geochemical program was divided roughly into two aspects:

1. Work involving particulate matter both as suspended particulates and as bottom sediments, and
2. collection of samples for analysis (on board and at Lamont-Doherty Geological Observatory) of naturally occurring radioactive species to measure mixing.

We accomplished the following: 1 six inch diameter Sanders Core (S6C-1). This coring device is a scale-up of one used last October on VEMA and retains the essential feature that water above the sediment - water interface is retained intact in the upper portion of the core liner. The purpose of these cores is to recover in as undisturbed a condition as possible a sample of the uppermost surface sediment and the water overlying it for diffusion studies. the major problem with this coring rig at this stage in its evolution was that, because its fingers deeply scored the edges of the core as it penetrated, the core catcher had to be omitted. This caused involuntary extrusion of the core and its loss into the water as soon as the bottom of the four foot long core barrel was raised above the air-sea interface. After some experimentation a collar and flap was designed to slide down the core tube and rotate across the cutting

edge to close off the core. This operation however, had to be done manually which meant that someone had to go into the water to release the collar and flap, slide it down the core barrel and close the flap. With some difficulty this operation is possible during July but must clearly be modified for the next cruise in January.

One core was successfully taken using this rig and, in an unwise concession to the difficulties of extruding such a core in a vertical position, the cutting head was omitted on the second try and the core liner and valve were sucked out of the core barrel by the friction of pull-out from the sediment and were lost.

8 three inch diameter Sanders Cores (S3C-1 through S3C-8). The same principle as that described above except that no problems of involuntary extrusion were encountered. A semi-circular metal flange however, had to be welded to the outside of the core barrel to reduce the possibility of overpenetration. This happened twice in very soft sediment and drove sediment up through the valve at the top of the liner.

74 Shipek Grab Samples (numbers SG150 through SG223). These are surface sediment grabs.

65 30 liter Niskin bottle casts (RN 50 through RN 114), usually consisting of eight bottles on the hydrowire. The following analyses were done on these samples: salinity, dissolved oxygen (top and bottom bottles in each cast), excess radon, turbidity (Hach turbidimeter), size frequency distribution of particulates by Coulter Counter, and water was filtered on to pre-weighed Nuclepore filters for gravimetric analysis of particulate concentrations. The filters will also be analyzed for mineralogy by X-ray diffraction and by combined scanning electron microscope - energy dispersion X-ray fluorescent for particulate compositions.

1 station (F-14) at which only one 30 liter Niskin was taken for the particulates work and not for radon.

63 stations at which the major nutrients silicate, nitrate and phosphate and dissolved oxygen were analyzed on all water samples taken as calibration for the STD. A total of 664 analyses of each of the three nutrients and 1030 analyses of dissolved oxygen were made.

62 stations at which 122 large volume (200 gallon) samples of water were taken from the surface down to 55 meter depth by lowering a submersible pump. These samples were numbered P-41 through P-162 in the log. These samples were chemically treated for the removal of radium and thorium-228 which will be analyzed in the laboratory. The water from 34 of these samples was filtered for discrimination between the concentration of these isotopes in the dissolved versus the particulate phases.

35 stations at which at least one sample of water was taken from the 1.7 l. STD calibration bottles for analysis of oxygen isotope ratios. 130 such samples were taken.

24 stations at which at least one sample of water was taken from the 1.7 l. STD calibration bottles for analysis of dissolved methane. 59 such samples were taken.

PHYSICAL OCEANOGRAPHY PROGRAM

The physical oceanography program consisted of the following measurements:

1. Continuous surface-to-bottom STD program: salinity and temperature profiles using a PLessey model 9040 STD sensor.

2. Water sampling program:

1.7 l. sea water samples collected by a General Oceanics

Rosette sampler in conjunction with the STD. These samples were routinely analyzed for salinity using a guildline Instruments model 8400 salinometer. The salinity samples were used to define maxima and minima indicated by the STD and to calibrate the STD in-situ. Dissolved oxygen analyses were run on board from all Rosette samples by the Geochemistry group using the Carpenter method and nutrient determinations were made on all samples (see Geochemistry Section). Hence the sampling interval chosen for the twelve bottles on the Rosette was determined by the requirements of adequately describing the O_2 and nutrient chemistry distribution, calibrating the STD and verifying inversions found in the water column.

3. Thermometry program; Six of the twelve Rosette bottles had frames for holding reversing thermometers. In conjunction with the salinity samples, the thermometry provided us with back-up hydrographic data that would be usable in lieu of the STD data should a major STD malfunction occur. Additionally the protected and unprotected thermometer data will be used to calibrate the STD temperature and depth sensors.

4. Surface temperature and salinity program: Continuous underway records of sea-surface temperature, air temperature and relative humidity were made throughout the cruise and underway surface samples were collected at 2 N.M. intervals and analyzed for salinity on board.

5. Bottom photography/nephelometry program: Two LDGO nephelometers were used - one that was attached to the STD wire just above the STD sensor, and the other in a normal camera/nephelometer con-

figuration. Due to the shallow water throughout much of the area, shallow nephelometry had to be restricted to the nighttime hours.

6. Long-term current measurements and nephelometry; A current meter/nephelometer package which was deployed on the previous leg of CONRAD in the Hudson Canyon was recovered successfully during the present leg. Analysis of the data is now underway at Lamont-Doherty Geological Observatory.

The following table summarizes the number of stations and samples collected for the physical oceanography program during the cruise.

Program	Station Numbers	Number of Stations, Samples
STD stations	381-444	64
Salinity samples	-	1180
Surface salinity samples		138
Nephelometer stations	1 - 38	38
camera stations	1 - 14	14
		1030

PERSONNEL

The following personnel comprised the scientific party on RC 19-01:

Geochemistry

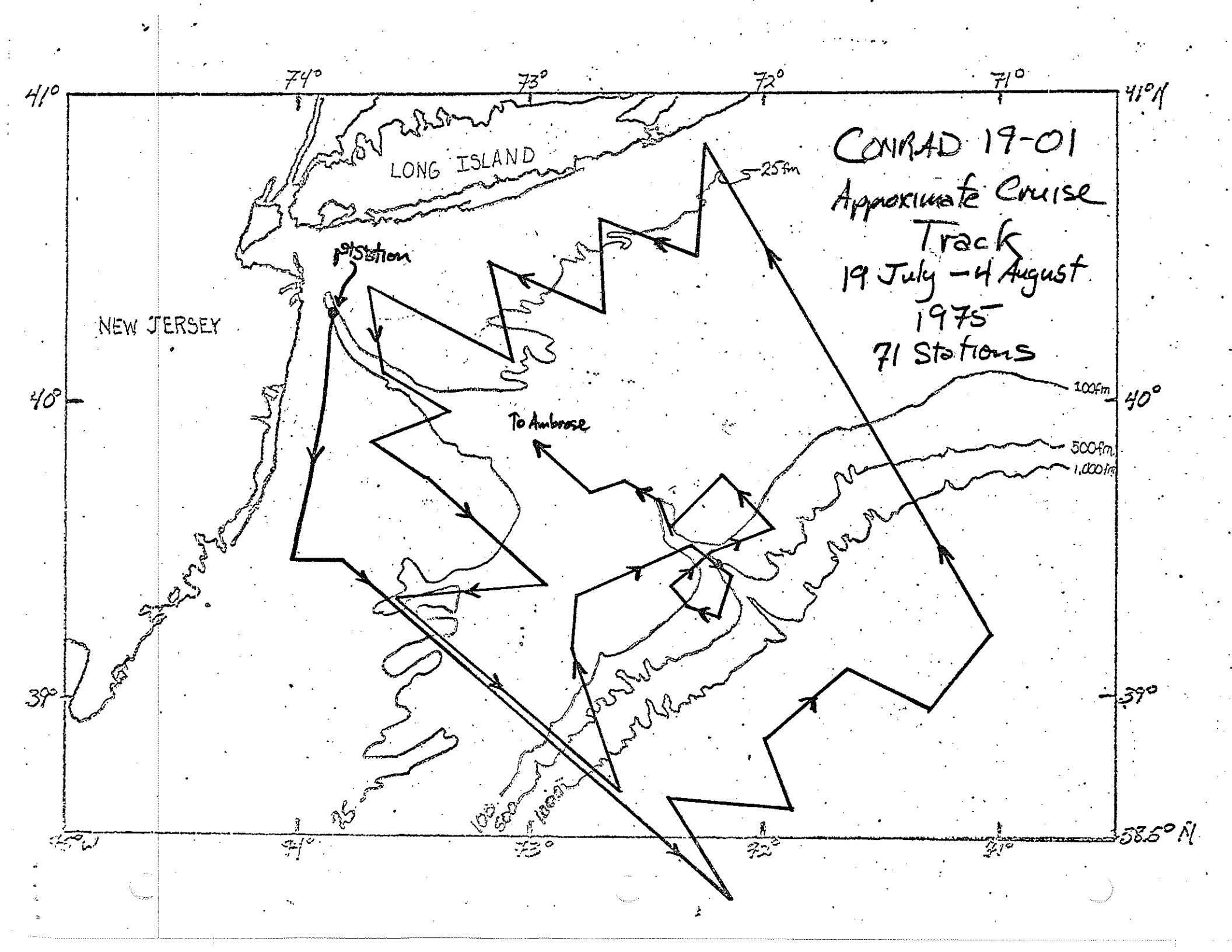
Pierre Biscaye (Co-Chief Scientist)
Bruce Deck
Herb Feely
Marty Friedmann
Adele Hanley
Cathy Haward
David Hadko
Carolyn Kent
Bruce Markwalter
Guy Mathieu
Curt Olsen
Mike Prokopchak
Rob Togweiller
Tom Torgerson

Physical Oceanography

Anthony Amos (Co-Chief Scientist)
Ted Baker
Kathy Cooke
Scott Daubin
Gene Molinelli
Jan Szelag

Other

Al Hagan (Core Bos'n)
Matt Bye (Core Crew)
Jim Williar (ET)


CONRAD 19-01
Approximate Cruise Track
19 July – 4 August
1975
71 Stations
LONG ISLAND
NEW JERSEY
1st Station
To Ambrose
25fm
100fm
500fm
1,000fm
41°
40°
39°
74°
73°
72°
71°
41°N
40°
39°
38.5°N